**SP21 Project: Analysis of First-Person A.I Training Methods**

Capstone Weekly Status Report

Kyle Hinton (kah31@hood.edu), Kyle McQuillen (kjm28@hood.edu), Paul Wells (pfw3@hood.edu), Somayyeh Kamyab (sk43@hood.edu), Yohannes Teref (yt13@hood.edu)

<https://github.com/rebeljedi999/TheCTeam>

**REPORT WEEK 5 (MAR 22 – MAR 28)**

1. Weekly Accomplishments
   1. Paul and Kyle H. worked on creating an API that worked with TFAgents.
   2. Kyle M. continued work on enemy detection and visual sensor data. Reviewed JSON packet transmission through the Unreal Engine.
   3. Somayyeh worked on implementing AI actions into the Unreal Engine.
   4. Yohannes worked towards implementing our first test level.
2. Problems/Issues
   1. Sommayyeh is struggling finding the proper events to be called in the engine for implementing the actions. She is resolving it through research and trial and error.
3. Next week’s planned work
   1. Kyle H. will continue implementation of the API on the flask server.
   2. Kyle M. will continue implementing data collection for the Unreal Engine and formatting it into JSON.
   3. Yohannes will continue designing and implementing our first test level for the agent to train on.
   4. Somayyeh will continue implementing our reward events and action events.
   5. Paul will prepare the Unreal Engine to send JSON data and assist others with the Unreal Engine.
4. Time log

|  |  |
| --- | --- |
| Last Name | Hours Worked |
| Hinton | 7.5 |
| Kamyab | 5 |
| McQuillen | 6 |
| Teref | 3.5 |
| Wells | 4 |
| Team Total | 26 |

**REPORT WEEK 4 (MAR 15 – MAR 21)**

1. Weekly Accomplishments
   1. Paul and Kyle H. Worked on implementing a tensorflow agent and a custom environment.
   2. Kyle M. worked on sending information from the Unreal Engine to the python server. He is also working on enemy recognition for the agent in the game.
   3. Somayyeh continued to familiarize herself with Unreal Engine and blueprint programming.
   4. Yohannes is learned level design and scoring in the Unreal Engine. Worked towards implementing our first test level.
2. Problems/Issues
   1. Paul and Kyle H. struggled to implement a custom environment in a way that’s compatible with the Unreal Engine setup. Potential resolution has been discovered by dissecting the Tensorflow library to better understand it. Further testing is needed.
3. Next week’s planned work
   1. Paul and Kyle H. will implement the full API to receive live data from the Unreal Engine and return data to the engine.
   2. Kyle M. is implementing data collection for the Unreal Engine and formatting it into JSON.
   3. Yohannes is designing and implementing our first test level for the agent to train on.
   4. Somayyeh is implementing our reward events and action events.
4. Time log

|  |  |
| --- | --- |
| Last Name | Hours Worked |
| Hinton | 7 |
| Kamyab | 1.5 |
| McQuillen | 4 |
| Teref | 5 |
| Wells | 7 |
| Team Total | 24.5 |

**REPORT WEEK 3 (MAR 8 – MAR 14)**

1. Weekly Accomplishments
   1. Paul implemented a flask server to run python on. Also installed a plugin to unreal to allow the sending of JSON to a server and receive JSON from a server. This is the beginning of the implementation of the AI.
   2. Kyle H. concluded C++ NN research and shifted to Tensorflow agent research for implementation.
   3. Kyle M. reviewed potential reward system implementation in UE4 and began figuring out how to translate in-game data into learnable data and how to transmit it through JSON.
   4. Somayyeh researched blueprints and reinforcement learning.
   5. Yohannes researched reinforcement learning and its implementation in tensorflow.
2. Problems/Issues
   1. Paul had issues getting the JSON plugin working with UE4, resolved by changing plugins.
3. Next week’s planned work
   1. Paul and Kyle H. will begin implementing reinforcement learning in Tensorflow to prepare fore data from the unreal engine.
   2. Kyle M., Somayyeh, and Yohannes will begin implementation of collection from the UE4 agents and the transmitting of data from the game to the learning server.
4. Time log

|  |  |
| --- | --- |
| Last Name | Hours Worked |
| Hinton | 3.5 |
| Kamyab | 5 |
| McQuillen | 7 |
| Teref | 4 |
| Wells | 15 |
| Team Total | 34.5 |

**REPORT WEEK 2 (MAR 1 – MAR 7)**

1. Weekly Accomplishments
   1. Kyle H. and Paul researched ways to implement a neural network into unreal engine and settled on a way that utilizes Tensorflow.
   2. Paul began the implementation of Tensorflow in the Unreal Engine.
   3. Kyle M., Somayyeh, and Yohannes did research on potential reward algorithms we could use and how to implement them into the Unreal Engine.
2. Problems/Issues
   1. Paul had issues with installing dependencies for the project, but resolved the issue by reinstalling python.
3. Next week’s planned work
   1. Kyle M, Somayyah, and Yohannes will implement the reward methods into the unreal engine.
   2. Kyle H. and Paul will implement the neural network with Tensorflow.
4. Time log

|  |  |
| --- | --- |
| Last Name | Hours Worked |
| Hinton | 3.5 |
| Kamyab | 3 |
| McQuillen | 1 |
| Teref | 3.5 |
| Wells | 4 |
| Team Total | 15 |

**REPORT WEEK 1 (FEB 22 - FEB 28)**

1. Weekly Accomplishments
   1. All team members installed, ran, and familiarized themselves with the Unreal Engine environment.
   2. Kyle H., Kyle M., Paul, and Yohannes began tutorials on reinforcement learning in Unreal Engine.
   3. Kyle M. researched genetic algorithms and their possible implementation in Unreal.
2. Problems/Issues
   1. Somayyeh had initial problems with C++ programming, but after reviewing her notes she completed the basic tutorials for the Unreal Engine.
   2. Kyle M. is still trying to figure out the best way to implement the genetic algorithm.
   3. Yohannes struggled with some of the concepts in the reinforcement learning tutorial, but after further research he understands the concepts that were presented.
3. Next week’s planned work
   1. Kyle M., Somayyah, and Yohannes will research methods to reward NN and document potential algorithms.
   2. Kyle H. and Paul will begin a basic implementation of Reinforcement Learning algorithm and NN to get first generation.
4. Time log

|  |  |
| --- | --- |
| Last Name | Hours Worked |
| Hinton | 4.5 |
| Kamyab | 2 |
| McQuillen | 4 |
| Teref | 5 |
| Wells | 4 |
| Team Total | 19.5 |